

AIR MINISTRY

Meteorological OfficeSPELLS OF DRY WEATHER IN SOUTH-WEST ENGLAND

By W. H. Hogg M.Sc. and R. W. Gloyne B.Sc.

The national campaign to encourage the maximum conservation of grass has shown the need for more detailed knowledge of the length and frequency of spells of dry weather during the warmer months of the year. The main objects of the present investigation are therefore:-

(i) to provide a method of estimating the frequency of spells of various lengths of dry weather in south-west England for each of the months May to August, and

(ii) to attempt a numerical estimation of the relative suitability for haymaking of different months and different places.

1. DATA

This investigation covers the counties of Gloucester, Wiltshire, Somerset, Dorset, Devon and Cornwall, and Fig. 1 shows the distribution of the 21 stations used. Where possible the data refer to the period 1921-46, but for a few places other periods had to be used (see Table I).

The daily rainfall records from these places have been used to compute the frequencies of 1, 2, 3, etc. consecutive days with no measurable rainfall, and these are given in Table I.

The following conventions were adopted in computing these frequencies:-

(i) A spell of dry weather starting in one month and ending in another has been credited to the month with the greater proportion of the spell.

(ii) If a spell is equally divided between two months, each of these months has been credited with half a spell of the full length.

(iii) For spells which begin before May 1 or end after August 31 only those parts which occur between May 1 and August 31 have been included.

2. ESTIMATION OF FREQUENCIES

In "Statistical methods in climatology" Brooks and Carruthers considered the frequency of spells of wet weather at Kew, and suggested that after 2, 3, ...n rain-days there is a constant probability P that it will rain the next day.

A similar method has been applied in this investigation. An examination of the data suggested that after 3, 4, ..., n dry days the probability P that it would be dry next day was fairly constant. For each station, theoretical frequencies for each month were calculated on the assumption of a constant probability. The observed and calculated frequencies were compared by using a χ^2 test* and the differences between these series were seen to be no more than might reasonably be expected as a result of chance fluctuations. The June workings for Weymouth are set out in the Appendix to this paper.

For each month, frequencies of 1 or more, 2 or more and 3 or more dry days, and of P, were plotted on maps and isopleths were drawn. Figs. 2-9 give the monthly isopleths for 3 or more days and for P. The maps for 1 or more and 2 or more days are not reproduced, but a sufficiently close estimate of these values can be obtained from Table I. Figs. 2-9 and Table I can thus be used to estimate the frequencies of dry spells of any length for any place in the south-west. Weighted frequencies of 1, 2 and 3 or more days are given in Table II for those stations with records differing

* For details of the chi-square test, see "Statistical methods in climatology" by C. E. P. Brooks and N. Carruthers, London, 1944, p.27.

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Comments

from the standard period 1921-46. When estimating frequencies of 1 or more and 2 or more days, values from Table II should be used in preference to those given in Table I.

Table I and Figs. 2-9 have been used to estimate the frequencies for Minchinhampton, Taunton and Okehampton, the names of which are in capital letters in Fig. 1. The frequencies at these places have also been computed from the daily records, and a χ^2 test has shown that the differences between the estimated and observed frequencies are statistically acceptable.

The estimation of the May frequencies at Minchinhampton is given as an example. By addition of the terms in Table I, the frequencies of spells of 1 or more and 2 or more days at places near Minchinhampton are:-

	1 or more	2 or more
Ross-on-Wye	134	77
Cheltenham	135	74
Bath	136	80
Bishops Cannings	132½	79½

From these values, frequencies of 137 and 76 are estimated for Minchinhampton.

From Fig. 2, the frequency of spells of 3 or more days is estimated as 54; P is estimated as 0.76 from Fig. 3. The frequency of 4 or more days is given by $54 \times 0.76 = 41.0$ and of 5 or more days by 41.0×0.76 , etc. Thus the estimated frequencies of spells of 1 or more 12 or more days are:-

Length of Spell ($\geq n$ days)

Days	1	2	3	4	5	6	7	8	9	10	11	12
Frequency	137	76	54	41.0	31.2	23.7	18.0	13.7	10.4	7.9	6.0	4.6

By subtraction of successive terms, the frequencies of spells of exactly 1, 2, ... days are:-

Length of Spell

Days	1	2	3	4	5	6	7	8	9	10	11	≥ 12
Frequency	61	22	13.0	9.8	7.5	5.7	4.3	3.3	2.5	1.9	1.4	4.6

3. AVERAGE LENGTH OF SPELLS OF DRY WEATHER

Table III gives the average length of all dry spells for each month, and also the average length of spells which last at least 3 days; these are of more practical importance than the shorter spells. The chief features of the monthly distributions for the longer spells are summarised below:-

May

The spells last more than 6½ days

- (a) along the south coast from Plymouth to Weymouth, and
- (b) in the Plain of Somerset

They are less than 6 days in length

- (a) over much of the peninsula west of about Yeovil, and
- (b) everywhere north of about Bath, except at Cheltenham

June

The spells last more than 8 days over a wide area which includes

- (a) the Severn Vale,
- (b) the Plain of Somerset (> 9 days in the Bridgwater region),
- (c) the Dorset Downs and Blackdown Hills, and
- (d) the coast east of about Sidmouth

- The average length decreases to less than 7 days
- (a) over parts of the Marlborough Downs,
 - (b) over Dartmoor and the Cornish Moors, and
 - (c) in the Barnstaple region

July

The spells are more than 6½ days long

- (a) in the northern part of the Severn Vale (> 7 days at Cheltenham)
- (b) over most of Dorset, including also the Yeovil district, and
- (c) along the coast near Plymouth

They are less than 6 days long

- (a) over Devon and Cornwall except along the south coast ($< 5½$ days on Dartmoor), and
- (b) over Exmoor and the region to the east as far as Bridgwater

August

The spells have an average length of more than 6 days everywhere east of a line from about Exmouth to Bridgwater except in the Yeovil-Mere region. ($> 6½$ days at Bishops Cannings)

They are less than 5½ days long

- (a) over Exmoor, and
- (b) in the Newquay district

4. CHANCES OF A SPELL OF 3, 6, 9, 12, 15 OR MORE DRY DAYS IN ANY YEAR

Table I gives the frequencies of spells of 1, 2, 3, ... dry days, but it contains no information on the distribution of these spells over the 26-year period. Table IV gives the number of years when there were spells of at least 3, 6, 9, 12 or 15 days, and can be used to estimate the chance that there will be a spell of given length in a particular year. At Ross-on-Wye, for example, in 10 years out of 26 there was a dry spell during May which was at least 9 days long; in other words, in 16 years out of 26 there was no dry spell as long as 9 days.

The same conventions were used in compiling Table IV as were used for Table I, with the following additional convention:-

- (iv) When a spell of dry weather starts in one month and ends in another, the month with the shorter proportion of the spell is credited with a dry spell of that length.

Thus if a dry spell in a particular year lasted for the last 10 days in May and the first 12 days in June, then May would be credited with dry spells of ≥ 3 , ≥ 6 , ≥ 9 days for that year and June with spells ≥ 3 , ≥ 6 , ≥ 9 , ≥ 12 , ≥ 15 days.

Table III shows that June stands out as the month most likely to experience dry spells. Using the mean values for the whole region a spell of 12 dry days in June is almost as likely as one of 9 days in any of the other months and a spell of 15 dry days in June is more likely than one of 12 days in the other months.

5. COMPARISON BETWEEN DIFFERENT MONTHS IN SOUTH-WEST ENGLAND

In order to compare the suitability of various months for haymaking at any particular place, an index must be devised which combines the effect of both the frequency and length of the dry spells.

Two methods of assessment are possible:-

(i) A value 1 is given to a spell of 3 days, a value $4/3$ to a spell of 4 days, $5/3$ to 5 days, etc. In practice it is more convenient to multiply all values by 3. The sums of these values can be used as indices.

(ii) A value of 1 is given to a spell of 3 days, and a value of 2 to a spell of 4, on the assumption that two spells of 3 days can be used for haymaking in a dry spell of 4 days, provided sufficient labour is available. Similarly a spell of 5 days is given a value of 3, etc. The sums of these values can be used as indices of suitability of different months and places for haymaking.

The monthly indices for each method are given in Table V. There is no great difference in the relative magnitudes of the two sets of values and those obtained by the first method will be used in the following discussion.

If the monthly index values at each station are arranged in order of magnitude, and values which differ from each other by less than 10 are counted as equal, the following generalizations emerge from the data:-

(i) June is the best month for haymaking (in respect of dry weather) over the whole region, except possibly in the Dartmoor region, where May is best at Tavistock and Princetown.

(ii) The next best month is May, except in the Dartmoor region (June), south-east Dorset and near Cheltenham (August).

(iii) August is the third best month except at Barnstaple, Tavistock and Cullompton (July), south-east Dorset and the Cheltenham district (May or July).

(iv) July is the worst month except at Barnstaple, Tavistock and Cullompton (August).

6. COMPARISON OF DIFFERENT REGIONS IN SOUTH-WEST ENGLAND

Fig. 10 shows isopleths which are based on the totals of the indices over the period May-August. In the centre of the region, south Somerset, values are about 1,300. Over most of the hills of Wiltshire and Gloucestershire they are 1,300-1,400, they rise above 1,400 along the Severn Vale and over much of Dorset where they exceed 1,500 in the Isle of Purbeck and Weymouth region.

In the west, values fall to about 1,100 along parts of the north Cornish coast and probably fall well below this on the moors. The south Devon coast appears to be a favoured area, as values are 1,400 eastward of Plymouth. Even further west, values are as high as 1,300 at Falmouth, and there is everywhere a marked contrast between the north and south coasts of the peninsula.

7. COMPARISONS WITH OTHER PARTS OF ENGLAND

The frequencies and suitability indices for Cambridge and Hoylake (Cheshire) have been computed to discover whether there is any marked contrast between south-west England on the one hand and east or north-west England on the other. These values are given in Tables I and V.

At both Cambridge and Hoylake the monthly indices decrease in the order June, May, August and July and the relative suitability of these months is the same as in south-west England.

The total of the monthly indices is 1,564 for Cambridge which is almost the same as that for Weymouth (see Fig. 10). The total for Hoylake is 1,229, a value which can be regarded as typical for the peninsula (west of

the line Bridgwater Bay-Lyme Bay). Hoylake is, however, more suitable than parts of north Cornwall and the moors.

A comparison of the magnitude of the monthly indices with those in south-west England is given below:-

May

The value of 388 for Cambridge is substantially the same as the value for Bridgwater, the most favoured part of the south-west in May. Plymouth, Bishops Cannings and Penzance are only slightly less suitable than Cambridge.

The value for Hoylake is 340, which is exceeded by about half the stations in the south-west.

June

The Cambridge value, 441, is equalled or exceeded along the south coast of Devon and over south-east Dorset (Exmouth, Weymouth, Holton Heath), in the Plain of Somerset (Bridgwater) and the Severn Vale (Cheltenham).

The value 366 for Hoylake is lower than anywhere in the south-west except in the western half of Cornwall (Penzance, St. Austell, Newquay) and in the Dartmoor region (Tavistock).

July

The value at Cambridge, 359, is higher than any value in the south-west, where the maximum is 348 at Weymouth.

The value for Hoylake is 256 and this is exceeded everywhere in the south-west except in Cornwall (Bude, Penzance, St. Austell, Newquay) and at Barnstaple.

August

The value for Cambridge, 376, is substantially the same as those in south-east Dorset, the most suitable region in August.

The Hoylake value, 267, is less than any in the south-west except those for St. Austell, Newquay, Tavistock and Barnstaple.

8. CONCLUSIONS

The following general conclusions are reached as to the suitability of south-west England for haymaking. The conclusions are based on one consideration only, the frequency of spells of dry weather. They may be modified by the consideration of other factors such as humidity, sunshine or wind speed.

(i) Over the region as a whole June is the best month, followed by May, August and July. This order probably applies to much of England.

(ii) The most favoured region is in south-east Dorset and the least favoured region is the north and west of Devon and Cornwall and over the moors.

(iii) In May and August the most favoured parts of the south-west are just about as suitable as Cambridge. In June they are definitely more suitable and in July they are somewhat less suitable than Cambridge.

(iv) In May, Hoylake is as suitable as about half south-west England, but in the other 3 months all south-west England, apart from the extreme west, is more suitable than Hoylake.

(v) Over the whole season, the Weymouth region is as favoured as Cambridge; only the moors and parts of north Cornwall are less suitable than Hoylake.

9. APPENDIX

As an example, the method of working the value for P is shown for June at Weymouth. Column 2 gives the frequencies of spells of various lengths, extracted from the daily weather records. Column 3 gives cumulative totals of these frequencies, and the values thus represent the number of spells of 1 or more days, 2 or more days, etc.

Frequency of dry spells at Weymouth in June

Length of dry spell	Observed	Cumulative observed	Cumulative computed	Computed	(O-C) ² /C
days					
1	28	108			
2	21½	80			
3	11	58½	58.5	9.1	0.40
4	11½	47½	49.4	7.7	1.88
5	7	36	41.7	6.5	0.04
6	4	29	35.2	5.5	0.36
7	3	25	29.7	4.6	0.56
8	3	22	25.1	3.9	0.01
9	4	19	21.2	3.3	
10	0	15	17.9	2.8	
11	1	15	15.1	2.3	0.24
12	2	14	12.8	2.0	
13	2	12	10.8	1.7	
14	0	10	9.1	1.4	0.69
15	2	10	7.7	1.2	
16	1	8	6.5	1.0	
17	0	7	5.5	5.5	
≥18	7	48*			
Total		376			7.48

* This value is the total of cumulative frequencies for 18, 19, ...35 days, which is the longest spell. It is needed to obtain the total, 376, which is used to compute P.

If there are N spells of 3 or more dry days, then assuming a constant probability P, the theoretical frequency of spells of 3 or more, 4 or more, ... dry days is given by the successive terms of

$$N(1 + P + P^2 + P^3 + \dots)$$

If T is the total of the cumulative observed frequencies from 3 or more days onwards,

$$T = N(1 + P + P^2 + P^3 + \dots)$$

$$= \frac{N}{1-P}$$

whence

$$P = 1 - N/T$$

Substituting the actual values in the example for Weymouth,

$$P = 1 - 58.5/376 = 0.84$$

Column 4 gives the cumulative computed frequencies, which are obtained by continued multiplication of 58.5 by 0.84, i.e. the values are 58.5, 58.5 x 0.84, 58.5 (0.84)², etc. This column has not been worked past the value for 17 or more days. Column 5 contains the computed frequencies for spells of exactly 3, 4, 5, ... days. These values are obtained by subtracting successive values in column 4. The last value, 5.5, is the computed frequency of spells of exactly 17, 18, 19, ... days.

The χ^2 test has been used to compare the observed and computed frequencies. The value for χ^2 is given by the sum of the values in Column 6 where O and C represent the observed and computed values from columns 2 and 5. As usual, the values have been grouped so that the computed frequencies in each group do not fall much below 5. In this example, $\chi^2 = 7.48$ and, with 7 degrees of freedom, the probability that this value will be exceeded lies between 0.3 and 0.5. There is therefore no reason for rejecting the hypothesis of a constant value for P.

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TABLE I
Frequency of spells of dry weather 1921-46

	Length of spell (days)																	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15		
Ross-on-Wye																	134	
May	57	24	11	15½	6	6½	2	3	4	0	2	1	0	0	1	1	112½	
June	33	25½	16	8½	5	4½	3	4	2	1	2	2	0	0	0	3	131½	
July	58	24½	17	9	4	0	2	1	4	4	3	0	0	0	1	2	132	
August	64	21	10	6	9	5	3	2	2	4	3	0	0	0				
Cheltenham																	135	
May	61	21	12	10	6	8½	2	5	3	0	4	1	0	½	0	1	108	
June	32	20	16	6	7	5½	3	2	2	0	4	1	0	1	2	3	121	
July	56	29½	13	7½	5	1	3	2	0	3	2	3	1	1	1	1	139	
August	52	29½	17	12½	5	5	2	4	1	2	2	3	1	1				
Bath																	136	
May	56	23	14	13	7	5½	7	1	1	2	4	2	0	0	0	½	111½	
June	34	25½	12	12	4	2½	4	0	2	3	0	0	1	1	1	1	135	
July	63	25½	10	12½	3	4	4	0	3	4	0	3	1	0	1	1	146½	
August	71	24	12	10½	8	2	4	5	1	0	4	2	1	0				
Bishops Cannings																	132½	
May	53	16½	16	13	7	7½	4	4	3	1	6	0	0	½	0	1	124½	
June	43	25½	15	7	10	6½	2	1	2	3	2	0	0	1	0	2	130½	
July	54	27½	14	14½	2	1	2	3	5	1½	1	2	1	0	1	3	130½	
August	58	22½	14	11½	4	3	4	1	3	½	3	1	1					
Larkhill																	130½	
May	54	18	16	12	7	4½	4	2	3	1	5	0	2	0	0	2	113½	
June	39	19	16	9	9	2½	3	0	1	3	0	1	1	0	1	2½	140½	
July	66	27	15	7	8	1	3	2	3	3	1	2	3	1	1	0	142½	
August	61	28	14	7	10	4	2	3	5	1	2	3	1	1				
Mere																	120	
May	48	17	17	10	5	6	2	4	3	2	2	1	0	0	0	3	104½	
June	31	21	10	6	11	5½	3	2	1	0	4	0	2	0	1	2	127	
July	58	21	16	5½	7	4½	3	1	4	1	1	1	1	0	1	1	131½	
August	56	19	19	6½	10	7	3	1	3	2	1	1	1					
Holton Heath*																	124	
May	47	22	9	9	11	5	7	3	4	1	2	1	1	0	1	1	108½	
June	30	22	12	9	4	6	5	3	2	1	0	½	5	1	0	8	126	
July	49	30	12	10	2	2½	7	2	2	3	1	1½	1	0	1	2	144½	
August	53	31	15	14	6	7½	3	4	3	1	1	2	1	1				
Weymouth																	129	
May	46	30	12	12	6	5	4	2	2	3	2	0	1	0	1	3	108	
June	28	21½	11	11½	7	4	3	3	4	0	1	2	2	0	1	4	130	
July	47	29½	13	10½	7	5½	3	3	2	1½	1	2	0	0	1	2	146	
August	58	26	15	18	6	6½	1	3	4	1½	1	1	0	2				
Bridgwater †																	124½	
May	37	30	9	13½	9	7	3	5	1	0	2	2	0	1	2	3	113½	
June	42	23½	7	6½	5	2	4	3	4	2½	3	0	3	0	1	0	137½	
July	65	23	14	12	7	3	2	2	1	2½	0	3	0	1	0	1	138½	
August	55	28½	16	8	6	4	2	7	1	0	5	2	2	0				
Yeovil																	124	
May	43	28	12	9	10	7	6	3	1	1	0	0	1	2	1	0	102½	
June	34	18½	11	10	3	2½	2	3	3	1½	3	0	2	0	0	2	121½	
July	55	23½	8	12	4	2½	4	3	1	1½	1	2	0	0	1	0	132	
August	59	22	14	9	8	4	3	5	2	2	2	0	0					
Cullompton																	127½	
May	52	20	14	13½	6	3	4	4	2	1	1	0	1	2	0	2	107	
June	41	18½	9	5½	3	3½	1	6	3	2½	3	3	1	1	0	0	120½	
July	59	15½	11	9	7	5½	1	3	3	3	0	0	0	2	0	0	139	
August	74	19	15	8	4	6	2	3	3	3	0	2						
Exmouth																	122½	
May	48	20	9	9½	10	7	1	2	5	4	1	4	0	1	0	1	120½	
June	47	16	11	11½	4	7½	0	4	4	5½	3	0	2	1	2	4	120½	
July	49	19	17	6	7	1½	4	3	3	1	2	3	1	0	1	1	139½	
August	60	22	16	10	9	5	2	4	2	2½	1	3	1	0				

TABLE I - continued

	Length of spell (days)															Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 > 15	
Barnstaple																
May	56	20	15	14½	9	6	1	8	2	1	1	0	0	0	0	135
June	48	23	7	8½	3	8	7	3	2	3½	0	0	2	0	0	117½
July	62	24	13	9	4	3½	2	1	4	½	2	0	0	1	0	128
August	83	28	17	5	4	5½	4	1	3	0	1	0	2	0	0	153½
Bude †																
May	54	18	18	9	6	9	4	1	1	2½	2	2½	0	0	2	130
June	38	25½	13	8	5	7	6	3	1	1½	2	4½	2	1	1	119½
July	68	27½	14	11	4	3	2	1	1	1½	1	0	0	0	0	138
August	67	18	18	9	4	5	6	0	1	½	2	0	3	0	0	134½
Tavistock																
May	51	19	15	13	7	6	3	5	3	0	2	0	1	0	0	128
June	44	29	14	11	5	1	2	2	2	2½	0	0	1	3	0	120½
July	56	19½	15	9	3	5	1	2	2	4	0	0	1	½	0	119½
August	74	25½	11	10	4	4	2	2	1	1½	1	0	1	2½	0	140
Princetown **																
May	30	17	10	5	5	5	2	5	0	0	1	0	1	1	0	84
June	31	20½	9	5	5	0	3	2	1	½	1	2	1	0	0	82
July	31	12½	10	6	4	2	1	1	2	2½	0	1	0	0	0	73
August	40	13	12	5	4	4	2	2	0	0	2	1	1	0	1	87
Plymouth §																
May	48	27	15	9	6	9	3	5	0	1	4	½	0	1	0	132½
June	44	23½	10	8	8	2	2	3	4	½	2	2½	0	1	0	116½
July	60	22	7	8	8	4	2	3	1	4	0	0	2	1	0	124
August	53	18½	18	15	7	4	1	5	1	½	2	3	0	0	2	131
Newquay																
May	62	21	14	12	6	6	4	3	1	0	2	1	1	0	0	135
June	44	31	15	8½	7	5	1	2	0	2½	0	6	2	0	0	126
July	65	35	13	8½	2	2	2	2	0	2½	1	0	0	1	1	135½
August	71	25	17	12	6	2	1	2	0	1½	3	1	1	0	1	143½
St. Austell																
May	44	22	15	16	3	6	2	5	2	1	2	0	0	2	1	123
June	45	27½	16	5	4	4	5	3	2	2½	2	0	2	1	0	122
July	70	24½	11	4	5	5	0	2	2	1	0	0	0	2	0	129
August	64	25	16	8	5	2	2	2	2	1	2	1	0	1	0	133
Falmouth																
May	51	20	15	13	3	8	4	4	2	0	3	0	0	1	0	127
June	59	20	16	4	4	3	5	4	2	½	1	3	2	0	0	128½
July	69	18	10	9½	8	4	3	2	1	2½	2	1	0	1	0	134
August	64	25	20	9½	7	4	2	1	1	1	1	2	1	1	2	142½
Penzance																
May	45	12	16	15½	9	7	3	3	2	1	1	2	0	0	0	119½
June	49	28	10	11	7	2	3	1	2	1	0	5	3	1	0	126
July	77	26	12	10½	6	1	2	0	0	½	0	2	1	1	0	141
August	66	23	16	13	2	5	1	3	1	½	5	2	2	0	0	144½
Cambridge																
May	54	17	21	13	9	6	5	3	2	2	3	1	1	1	0	139
June	45	13	9	13	10	5	3	2	0	2	5	3	1	0	0	117
July	52	27½	13	12½	5	3	3	2	4	2	2	1	3	0	0	133
August	65	29½	14	11½	7	9	5	3	4	0	0	1	2	0	1	153
Hoylake																
May	48	22½	15	8	9	6	2	5	3	2	0	4	0	1	0	126½
June	52	24	12	8	2	7	4	4	2	3	2	1½	2	1	0	127½
July	65	34½	11	7½	6	1	7	3	2	2	0	0	2	1	0	142½
August	70	33	20	7½	9	5	2	1	0	4	1	0	0	1	1	154½

* 1920-45

† 1919-44

‡ 1920-23, 1925-46

** 1929-46

§ 1916-28, 1930-40, 1942-43

TABLE II

Frequency of spells of 1 or more, 2 or more and 3 or more days with dry weather

(weighted to period 1921-46)

These weighted values have been computed for stations with data for a period other than 1921-46. The values for 3 or more days have been used in Figs. 2, 4, 6, 8.

	May			June			July			August		
	≥1	≥2	≥3	≥1	≥2	≥3	≥1	≥2	≥3	≥1	≥2	≥3
Holton Heath	123	76	57	110	77	56	128½	80	49½	147	89	58½
Bridgwater	124½	86	57½	111	68	44	138	78½	51	139½	82½	53
Bude	131	74	58	122½	81½	56	144	72½	44½	132½	63½	46
Princetown	125	77	51	115½	72½	47½	104½	62	41	118½	62½	45½
Plymouth	128½	82½	59½	118	76	53½	131	72½	46	143	79	52

TABLE III

Average length of spells of dry weather

(a) ≥ 1 day (b) ≥ 3 days

	May		June		July		August	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Ross-on-Wye	3.1	5.8	4.3	7.4	3.2	6.4	3.1	6.5
Cheltenham	3.2	6.1	4.8	8.1	3.4	7.3	3.3	6.1
Bath	3.1	5.7	4.4	7.8	3.0	6.4	3.1	6.4
Bishops Cannings	3.5	5.9	3.9	6.9	3.1	6.1	3.3	6.6
Larkhill	3.4	6.1	4.2	7.2	3.0	6.2	3.2	6.2
Mere	3.5	6.2	4.8	8.2	3.1	6.1	3.2	5.7
Holton Heath	3.5	6.3	5.0	8.4	3.3	6.6	3.4	6.1
Weymouth	3.5	6.5	5.2	8.4	3.5	6.5	3.3	6.0
Bridgwater	3.9	6.7	4.8	9.4	2.9	5.9	3.4	6.4
Yeovil	3.3	5.8	4.7	8.2	3.2	6.6	3.0	5.8
Cullompton	3.3	5.9	4.5	8.5	3.2	6.3	2.8	5.8
Exmouth	3.6	6.5	4.3	7.6	3.5	6.3	3.3	6.2
Barnstaple	3.1	5.5	4.0	7.8	2.8	5.9	2.4	5.3
Bude	3.3	5.9	4.0	7.0	2.7	5.9	2.9	5.7
Tavistock	3.4	5.9	3.5	6.8	3.0	5.9	2.7	6.0
Princetown	3.5	6.2	3.2	6.3	2.9	5.3	3.0	5.6
Plymouth	3.6	6.5	4.1	8.0	3.2	6.9	3.3	5.8
Newquay	3.0	5.8	3.6	6.8	2.5	5.7	2.6	5.3
St. Austell	3.5	6.0	3.7	7.1	2.6	6.3	2.8	5.8
Falmouth	3.4	6.1	3.7	7.5	3.1	6.5	3.0	5.8
Penzance	3.6	5.8	3.7	7.4	2.5	5.8	2.9	5.7
Cambridge	3.4	5.7	4.4	7.5	3.5	6.7	3.3	6.3
Hoylake	3.4	6.1	3.7	7.1	2.7	6.0	2.6	5.2

TABLE IV

Number of years in 26 with at least one spell of dry weather of lengths

≥3, ≥6, ≥9, ≥12, ≥15 days

	Length of spell. (days)						Length of spell. (days)				
	≥3	≥6	≥9	≥12	≥15		≥3	≥6	≥9	≥12	≥15
Ross-on-Wye											
May	25	18	10	3	2		26	17	9	5	2
June	25	21½	12	8	7		26	22½	16½	10	5
July	25	17	13	5	3		26	16	10	6	4
August	25	16	10	2	2		24	15	9	4	0
Cheltenham											
May	25	19	10½	2½	1		26	20	15	6	1
June	26	21½	16½	10½	9		26	24½	16½	9	6
July	25	18	12	6	4		25	17½	12½	6	2
August	26	17	10	6	1		25	16½	10½	6	2
Bath											
May	25	18	10	2½	½		26	18	6	1½	1½
June	26	20½	16	11½	9½		26	21	11½	5½	4½
July	25	19	12	7	2		25	15	9½	3	2
August	26	16	9	4	2		24	12½	6	2	0
Bishops Cannings											
May	26	18	11	1½	1		25	21	11	5½	3
June	26	19½	14½	7½	4		26	20	13	8½	4
July	24	15½	12½	5	2		24	13	7½	4	1
August	25	16½	10½	6	4		26	13½	6½	3	1
Larkhill											
May	26	17	12	4	2		26	17	8	4	3
June	26	21½	16	12	6		26	15½	10½	7	4
July	25	14	11	4½	2½		24	14	9	3½	2
August	24	16	11	5½	½		24	13½	6½	4	1
Mere											
May	24	17	11	4	3		25	21	9½	5½	4
June	26	21½	15	10	8		26	21	15	8½	6
July	25	16	11	5	3		22	19	10½	5	2
August	25	15	8	4	2		26	16	9½	6	3
Holton Heath											
May	25	21	12	4	2		22	16	6	4	2
June	26	23	16	14½	8		26	16	10½	8	2
July	25	17	12	5½	3		22	9	5½	3	2
August	26	17	9	5	1		25	9½	5½	3	1
Weymouth											
May	26	19	12	6	5		25	17	10	5	3
June	26	23	18	13	10		26	20	11½	6	3
July	26	18½	12½	7	5		23	12	7	4	2
August	26	15½	9½	5	3		24	13	7	4	2
Bridgwater											
May	26	19	12	9	5		26	19	9	4	3
June	26	24	19	11	7		26	21	12½	9	5
July	24	13	10	5	2		24½	14	10	5	3
August	26	17	11	6	2		26	15	9	7	3
Yeovil											
May	23	19	6	4	1		26	18	9	5	3
June	26	23½	17	11	9		26	18	12	11	3
July	25	16½	9½	6	4		23	9½	6½	6	2
August	25	16	8	2	1		26	15½	8½	4	0
Cullompton											
May							26	17	9	5	2
June							26	22½	16½	10	5
July							26	16	10	6	4
August							24	15	9	4	0
Exmouth											
May							26	20	15	6	1
June							26	24½	16½	9	6
July							25	17½	12½	6	2
August							25	16½	10½	6	2
Barnstaple											
May							26	18	6	1½	1½
June							26	21	11½	5½	4½
July							25	15	9½	3	2
August							24	12½	6	2	0
Bude											
May							25	21	11	5½	3
June							26	20	13	8½	4
July							24	13	7½	4	1
August							26	13½	6½	3	1
Tavistock											
May							26	17	8	4	3
June							26	15½	10½	7	4
July							24	14	9	3½	2
August							24	13½	6½	4	1
Plymouth											
May							25	21	9½	5½	4
June							26	21	15	8½	6
July							22	19	10½	5	2
August							26	16	9½	6	3
Newquay											
May							22	16	6	4	2
June							26	16	10½	8	2
July							22	9	5½	3	2
August							25	9½	5½	3	1
St. Austell											
May							25	17	10	5	3
June							26	20	11½	6	3
July							23	12	7	4	2
August							24	13	7	4	2
Falmouth											
May							26	19	9	4	3
June							26	21	12½	9	5
July							24½	14	10	5	3
August							26	15	9	7	3
Penzance											
May							26	18	9	5	3
June							26	18	12	11	3
July							23	9½	6½	6	2
August							26	15½	8½	4	0

TABLE V

Monthly indices of suitability for haymaking (computed by two methods)

The values are based on the frequencies given in Table I. In method (i), weights of 3, 4, 5, ... are given to the frequencies for 3, 4, 5, ... days. In method (ii), weights of 1, 2, 3, ... are given to the frequencies for 3, 4, 5, ... days. The monthly indices are the sums of the weighted frequencies.

	May		June		July		August	
	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)
Ross-on-Wye	307	201	399	290	316	218	307	213
Cheltenham	324	218	451	339	333	242	349	234
Bath	325	211	408	304	296	203	331	228
Bishops Cannings	373	247	386	274	297	199	331	231
Larkhill	359	242	401	290	295	200	333	228
Mere	340	230	430	325	293	197	322	209
Holton Heath	347	237	473	360	309	215	371	250
Weymouth	344	238	493	376	348	241	374	250
Bridgwater	387	272	451	355	290	191	354	244
Yeovil	305	199	411	311	282	196	298	196
Cullompton	329	218	405	310	292	200	280	184
Exmouth	357	248	437	322	332	227	354	239
Barnstaple	322	204	379	282	248	164	224	139
Bude	345	229	390	278	249	164	283	184
Tavistock	343	227	324	229	264	175	248	166
Plymouth	375	250	392	294	290	206	343	224
Newquay	300	196	345	243	204	133	252	157
St. Austell	343	229	354	255	218	149	256	168
Falmouth	339	227	372	273	304	210	308	201
Penzance	360	235	362	264	220	144	290	189
Cambridge	388	252	441	323	359	252	376	257
Hoylake	340	228	366	263	256	170	287	164

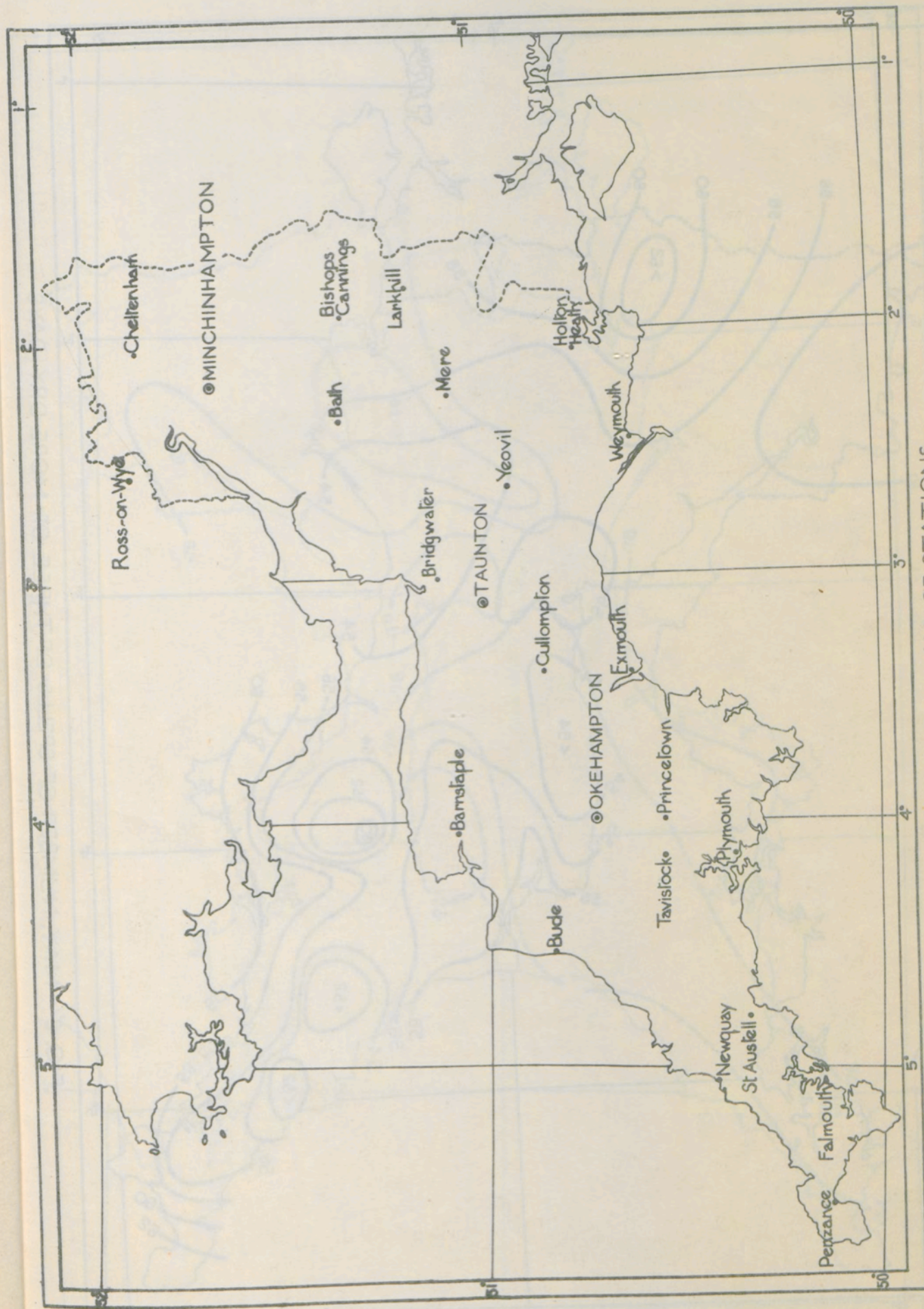


FIG.1 - INDEX MAP OF STATIONS
The stations marked © were used to test the method

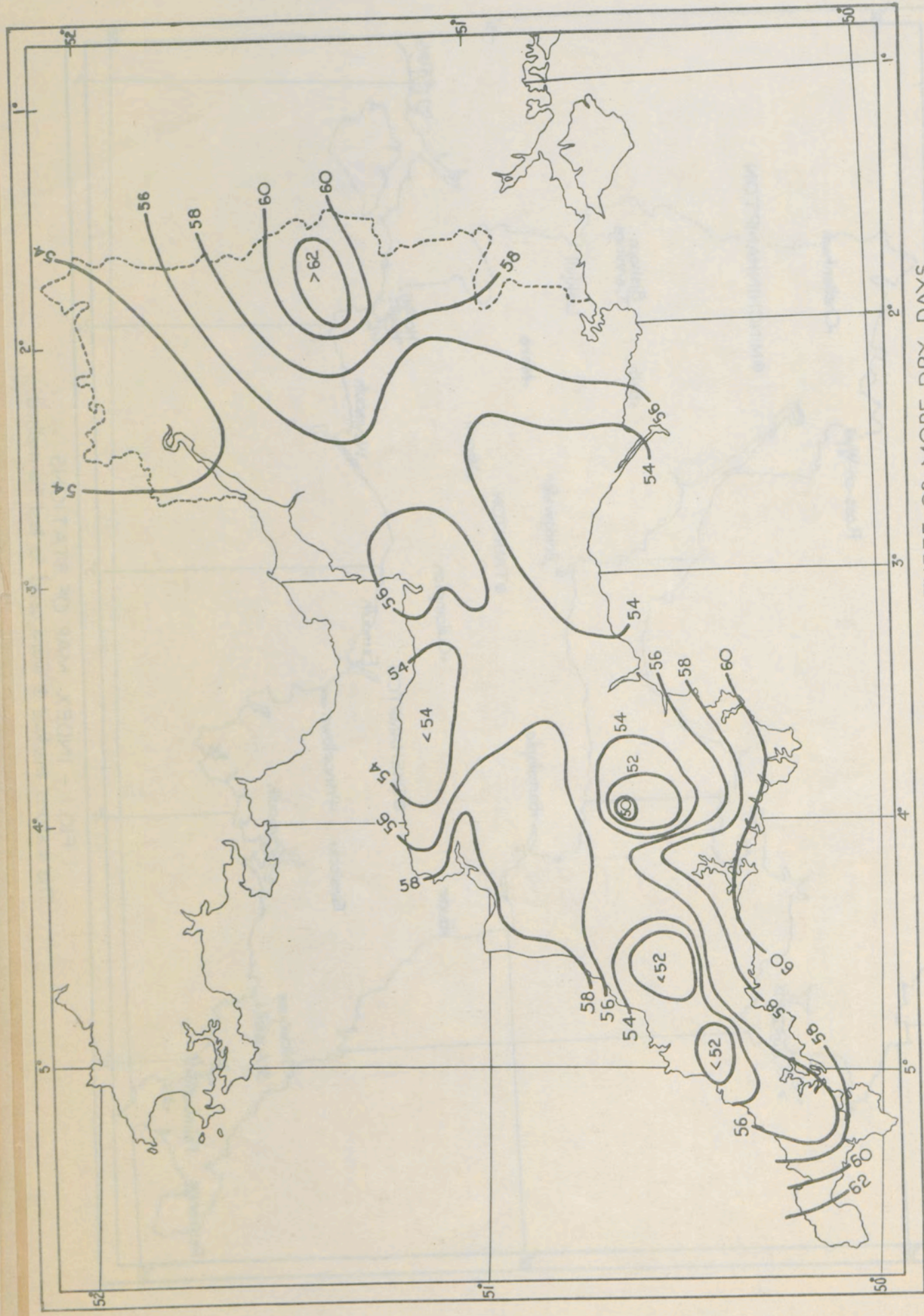


FIG. 2 - MAY, NUMBER OF SPELLS OF THREE OR MORE DRY DAYS

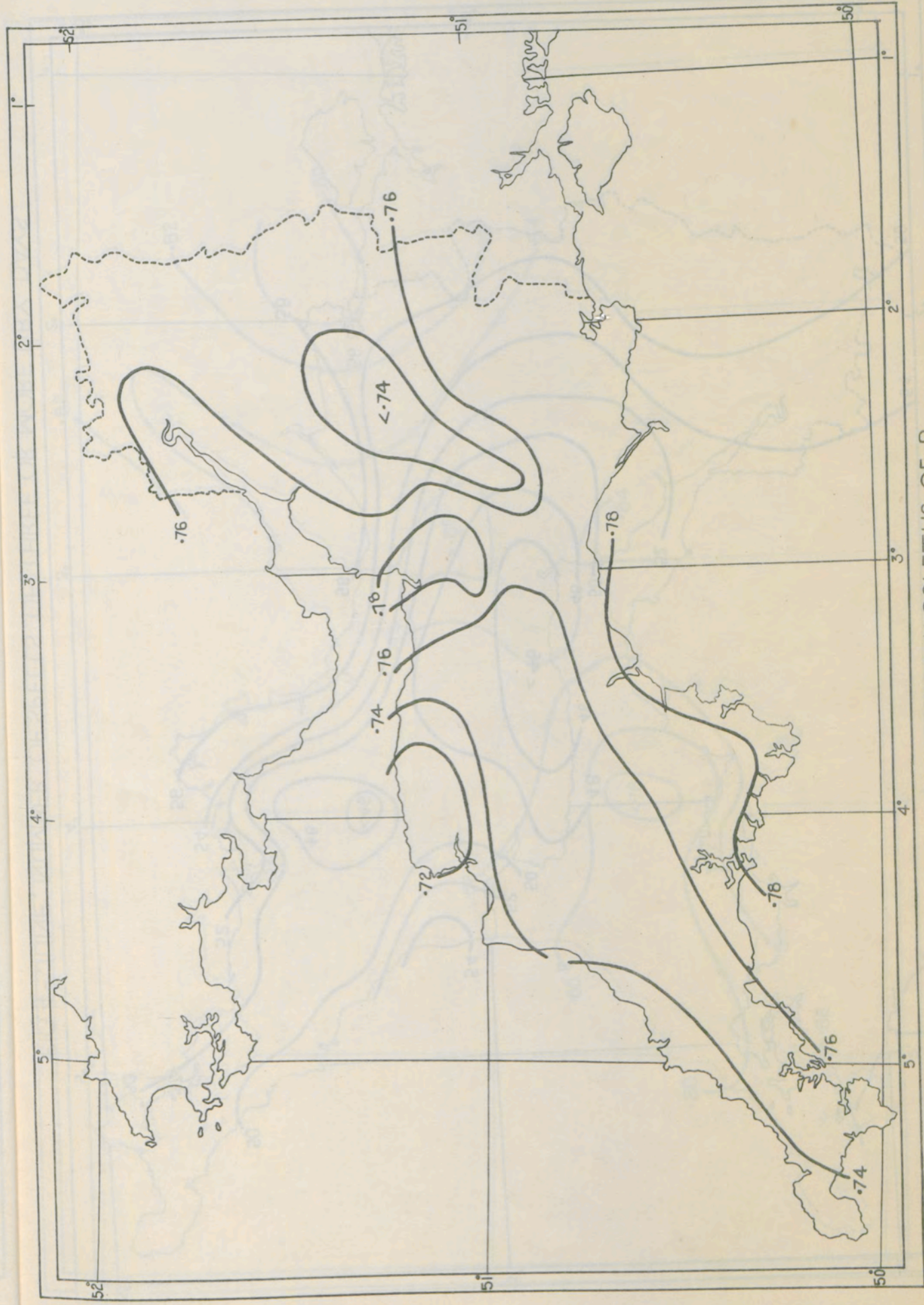


FIG. 3 - MAY, ISOPLETHS OF P

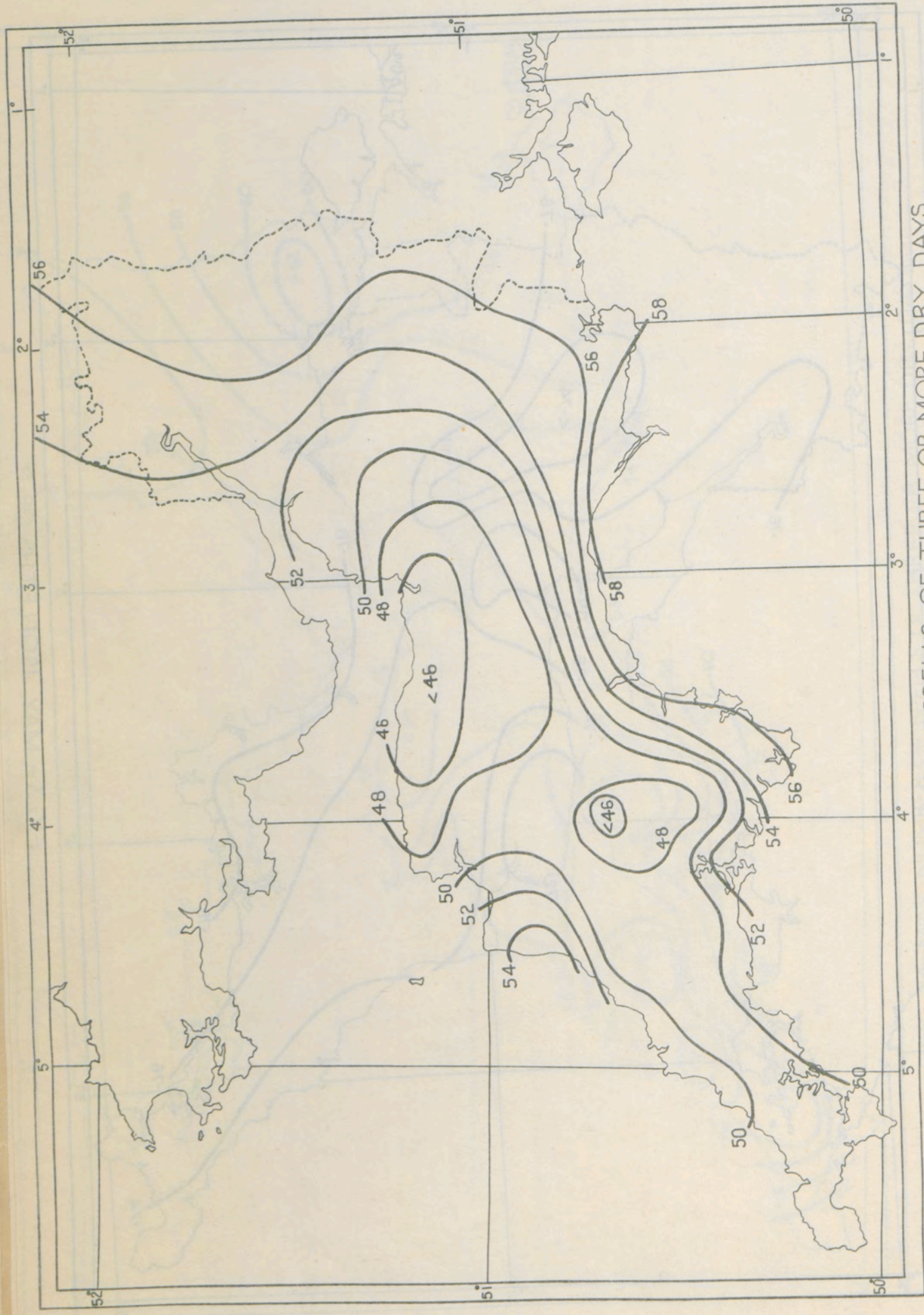


FIG.4- JUNE, NUMBER OF SPELLS OF THREE OR MORE DRY DAYS

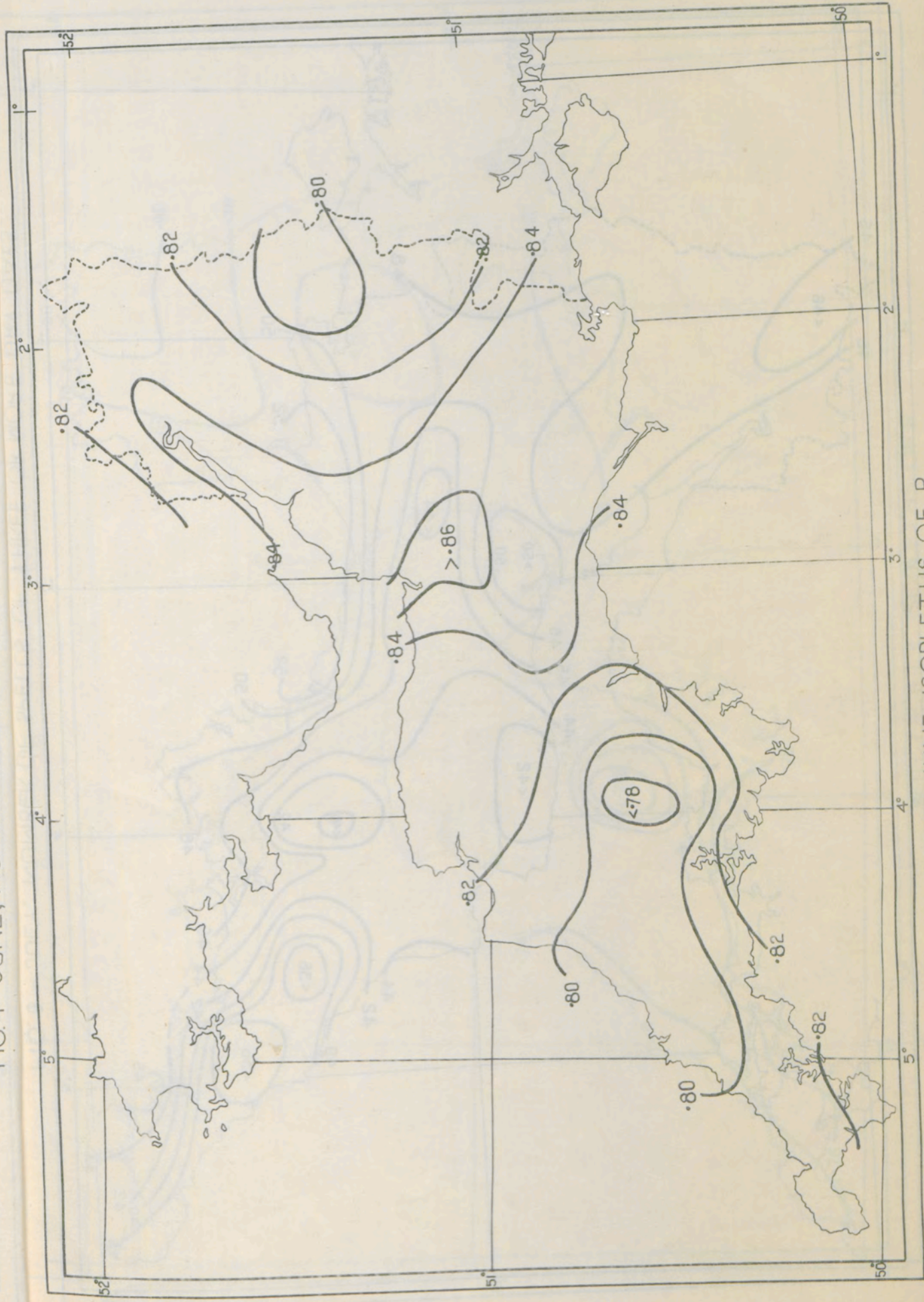


FIG.5 - JUNE, ISOPLETHS OF P

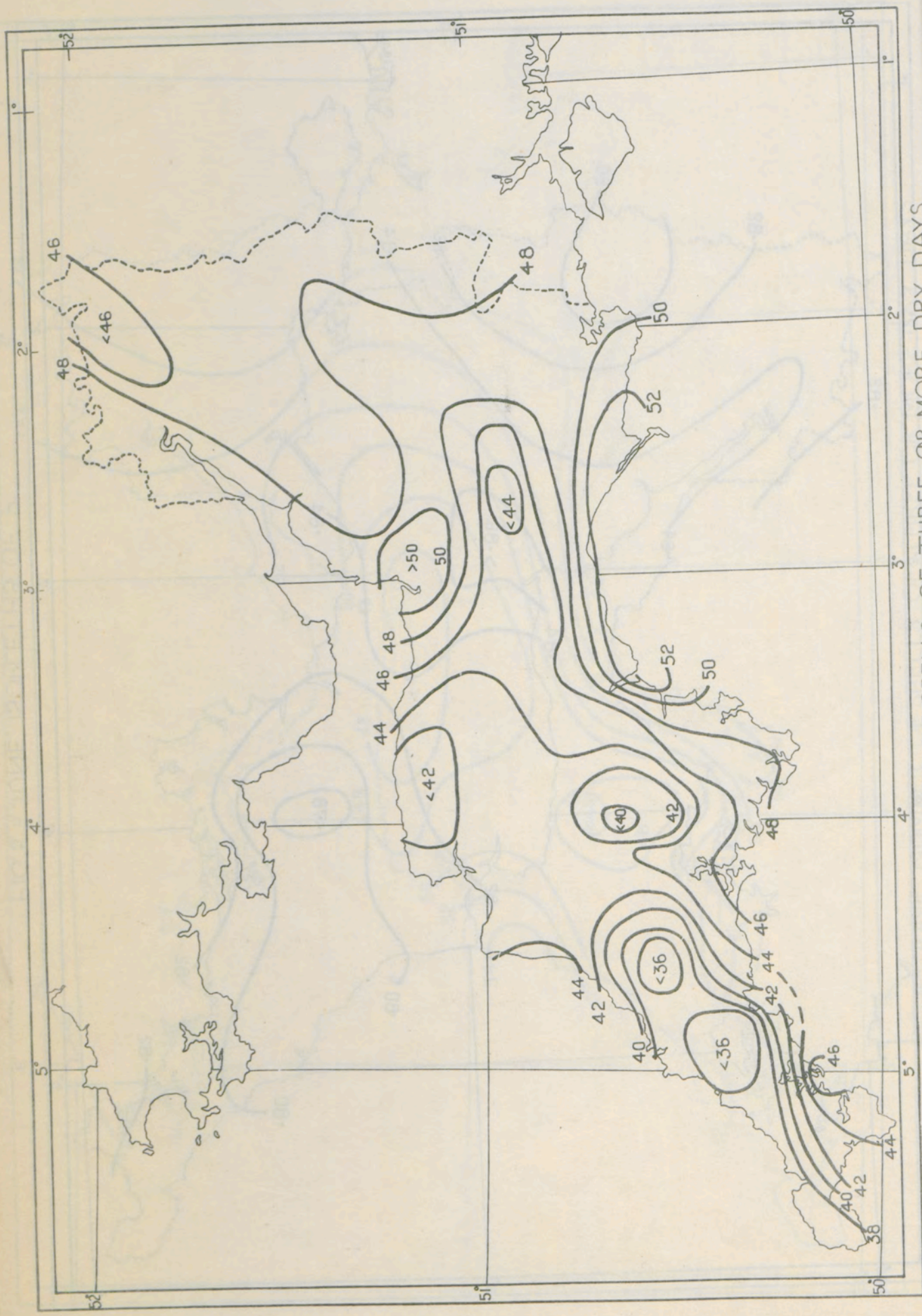


FIG. 6 - JULY, NUMBER OF SPELLS OF THREE OR MORE DRY DAYS

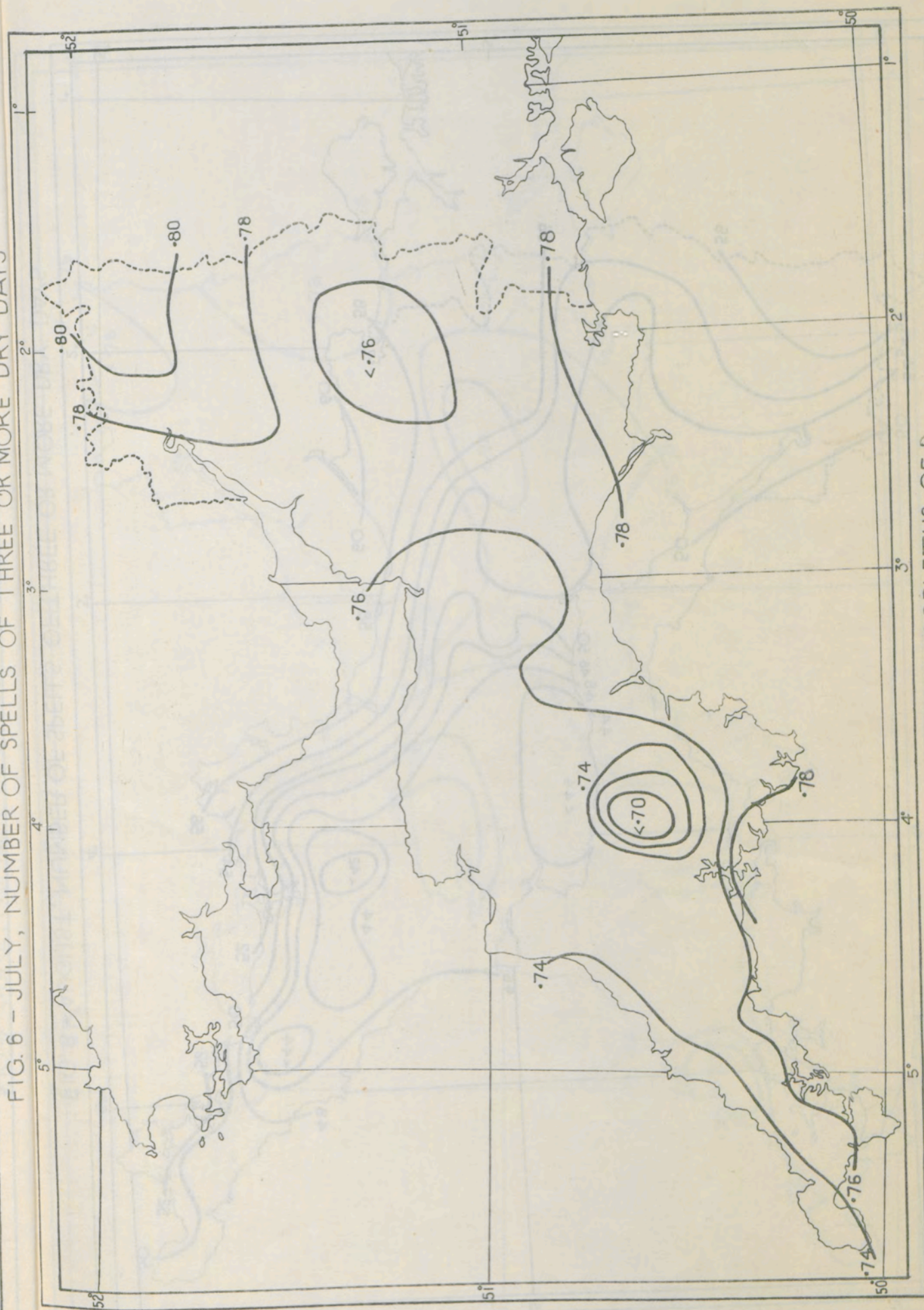


FIG. 7 - JULY, ISOPLETHS OF P

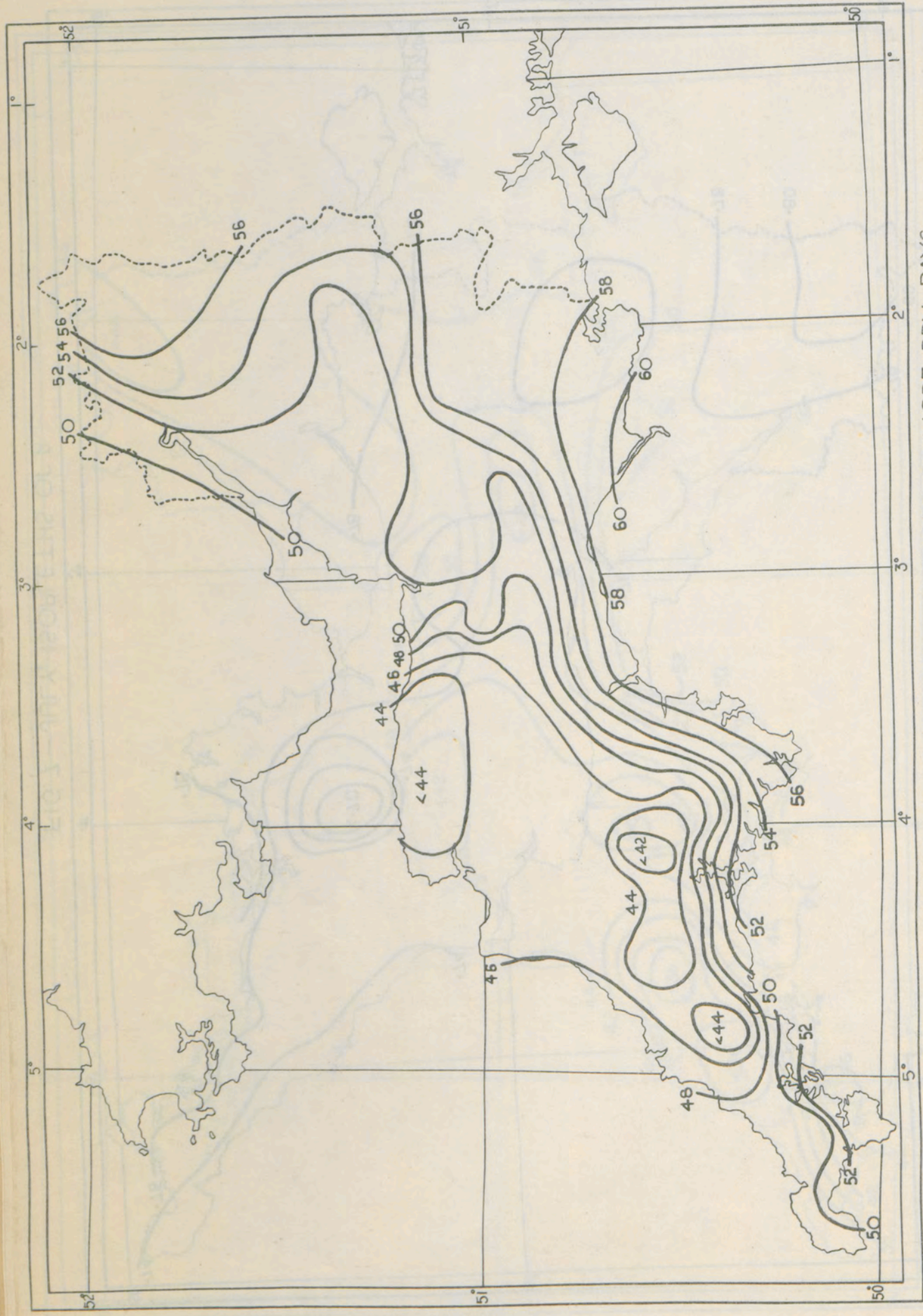


FIG. 8 - AUGUST, NUMBER OF SPELLS OF THREE OR MORE DRY DAYS

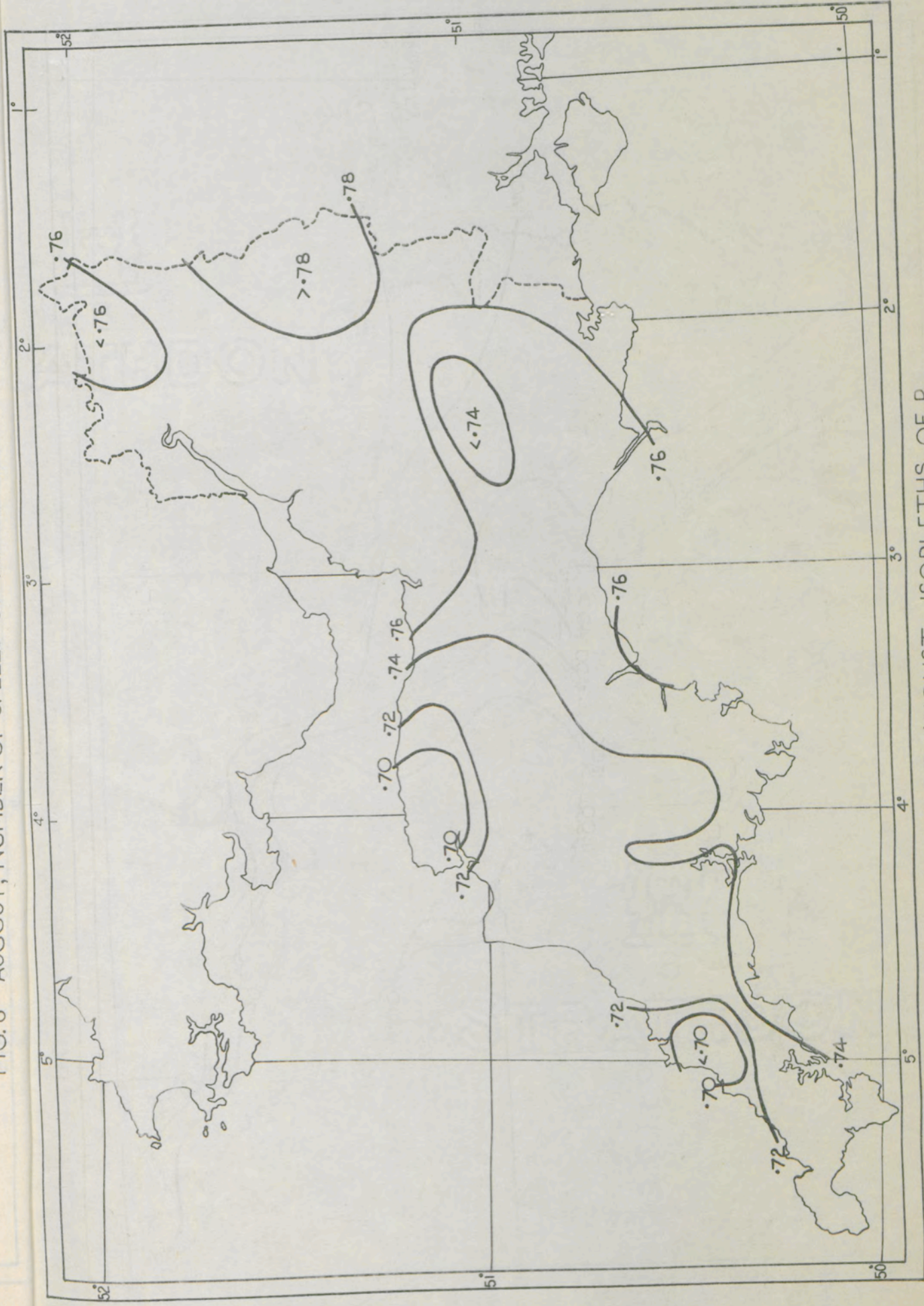


FIG 9-AUGUST, ISOPLETHS OF P

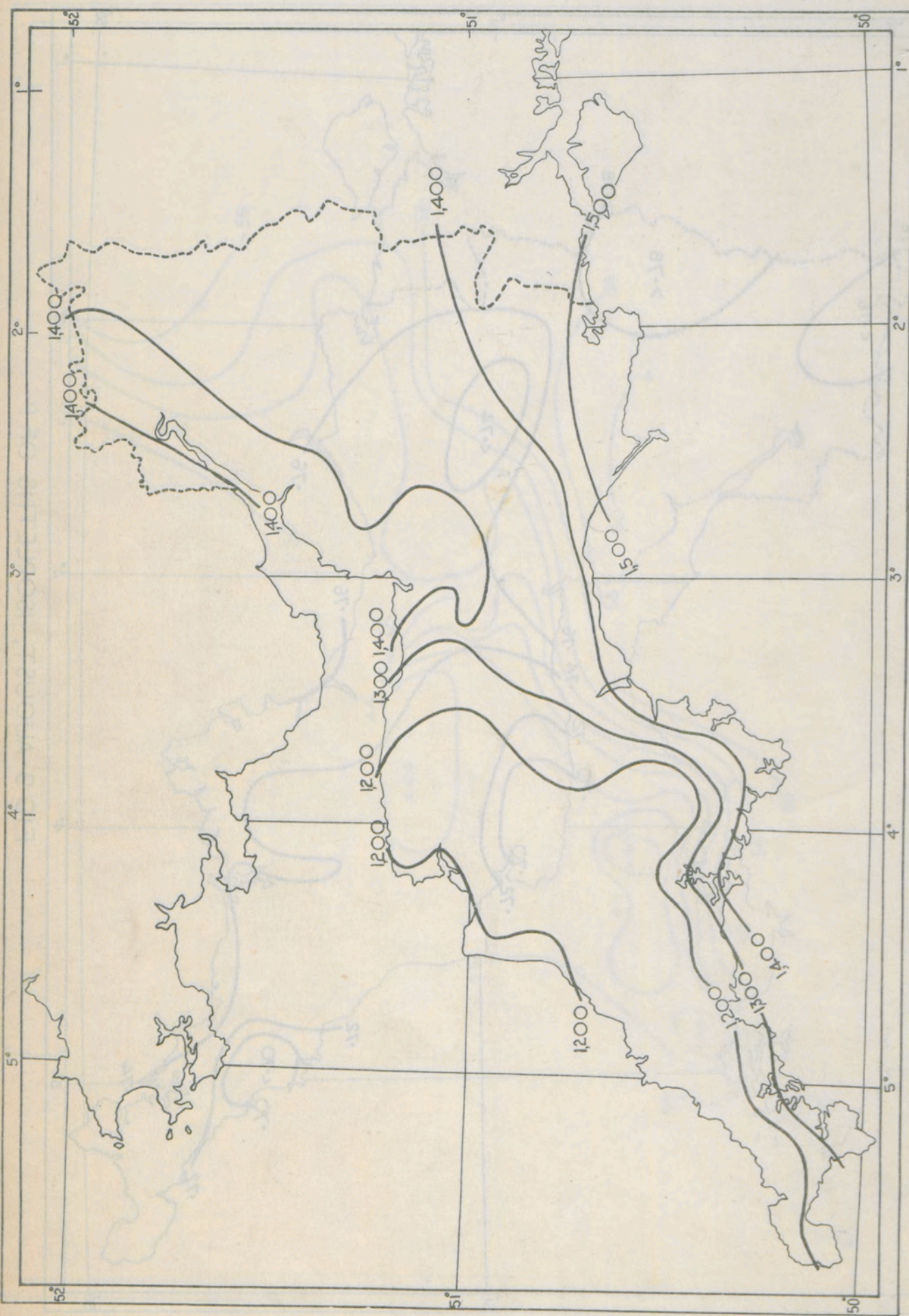


FIG. 10 - SUITABILITY INDICES, TOTAL, MAY TO AUGUST